

## Brush, Jason

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**From:** Brush, Jason  
**Sent:** Friday, August 16, 2013 7:31 PM  
**To:** Sumner, Rich  
**Cc:** Goldmann, Elizabeth; Leidy, Robert; Jessop, Carter  
**Subject:** Fw: Indirect loss of potential waters of the U.S. at Rosemont  
**Attachments:** Rosemont Indirect Impacts Alt 3 Barrel\_08162013.pdf; Patterson\_Annandale\_2012\_GeomorphicAssessBarrekCreek 18JUL12.pdf

Rich - In case you have ongoing interest and time...

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**From:** Goldmann, Elizabeth  
**Sent:** Friday, August 16, 2013 11:12:49 AM  
**To:** Brush, Jason; Jessop, Carter; Leidy, Robert  
**Subject:** FW: Indirect loss of potential waters of the U.S. at Rosemont  
[Let's talk about this in person next week. Thanks.](#)

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**From:** Brian Lindenlaub [mailto:blindenlaub@westlandresources.com]  
**Sent:** Friday, August 16, 2013 10:50 AM  
**To:** Goldmann, Elizabeth  
**Cc:** Blaine, Marjorie E SPL; 'Kathy Arnold'; Jamie Sturgess; 'ANDERSON, ROBERT'; Greg Williams  
**Subject:** Indirect loss of potential waters of the U.S. at Rosemont

Elizabeth,  
Per the request of Marjorie Blaine (Corps), I am providing the attached information describing how indirect impacts to potential waters of the U.S. resulting from the Rosemont Project were calculated.  
Per Corps guidance, the estimate of indirect loss of potential waters of the U.S. was initially determined based on the area of Barrel Canyon, within the ordinary high water mark (OHWM), between the toe of the perimeter berm and the confluence of Barrel and McCleary canyons. This area is approximately 2.8 acres.  
Approximately three weeks ago, Ms Blaine determined that additional indirect impacts to potential waters of the U.S. should be calculated based on the 2012 modeled reduction in surface water flow volume resulting from the Rosemont Project. WestLand has estimated these additional impacts based on the "Barrel Alternative" which has been identified as both the LEDPA by the Corps and the preferred alternative by the Coronado National Forest. Once the approach described here is approved by the Corps, these impacts may be readily extrapolated for the other alternatives. The Preliminary Administrative Final Environmental Impact Statement (PA FEIS) identifies several discrete downstream segments of Barrel and Davidson canyons which will be impacted by the Rosemont Project. In order, from upstream to downstream, these reach segments are referred to as follows (see attached Figure 1):

- Barrel Canyon Reach 1
- Barrel Canyon Reach 2
- Davidson Canyon Reach 2
- Davidson Canyon Reach 3
- Davidson Canyon Reach 4

For our analysis, Barrel Canyon Reach 1 was further divided into Reaches 1A and 1B in order to reflect the short reach of Barrel Canyon down to the confluence with McCleary Canyon.

The post-mining estimated reduction in average annual flow volume at the SR 83 stream gage (at the point that separates Barrel Canyon Reaches 1 and 2) is approximately 17%. During mining operations, the reduction in average annual flow volume peaks at approximately 36%, then reduces steadily during concurrent reclamation to the final post-mining reduction of 17%. The reduction in surface flows will result in a commensurate reduction in sediment loads, though sediment concentration is anticipated to remain largely unchanged. An evaluation by Golder Associates, Inc. (2012), attached, concluded that the development of the Rosemont Project "will have no significant impact on the geomorphology of either Barrel Creek or Davidson Canyon" due to 1) the sediment-transport limited nature of the two

streams, 2) the presence of two downstream grade control structures in Barrel Canyon, and 3) the limited nature of the convective storms within the watershed.

In order to estimate the indirect “loss” of potential waters of the U.S. downstream of the Rosemont Project, the OHWM of Barrel and Davidson canyons was mapped via aerial photo review to the confluence of Davidson Canyon and Cienega Creek. Both drainages are generally confined and the aerial photo OHWM mapping effort is anticipated to have a relatively high degree of accuracy. The area of potential waters of the U.S. within each stream segment was then calculated from the OHWM mapping. Because the loss of function within each of the considered stream reaches is considerably less than 100%, it was determined that the “loss of potential waters of the U.S.” (measured in acres) would be some fraction of the total area of each stream segment. The reduction in average annual flow volume provides a reasonable surrogate for the fractional loss of function. Therefore, the “loss of potential waters of the U.S.” was calculated by multiplying the percent reduction in average annual flow volume for a given stream segment by the total acreage of potential waters of the U.S. in each stream segment.

The attached table provides the estimated “loss of potential waters of the U.S.” for both the post-mining period as well as the construction and operations period (an estimated 25-30 years). During operations, an estimated 28.4 acres of potential waters of the U.S will be “lost”, while post-mining the estimated “loss” is 15.3 acres.

As always, if you have any questions or require an additional information please do not hesitate to contact me.

Regards,

Brian Lindenlaub | Principal

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